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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/996,293	11/28/2001	Yam Mo Wong	P/4076-7	4029

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EXAMINER

EDMONDSON, LYNNE RENEE

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 04/01/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/996,293

Applicant(s)

WONG ET AL.

Examiner

Lynne Edmondson

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/21/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 2, 4-9, 14, 18-20 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Hatakenaka et al. (USPN 4301958).

Hatakenaka teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (3, 5a-5c) and a plurality of work holders (tables, 54) separated by gaps for bonding different types of wires (figures 1-3 and col 2 line 45 – col 3 line 5). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (conveyors) with indexing (positioning) means (col 5 line 65 – col 6 line 41) and transporting rollers (col 3 lines 62-66). The apparatus includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (col 3 lines 9-42 and col 5 lines 1-55). Components and drivers are housed in the storage means (col 7 lines 19-43). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc and are capable of performing

different independent operations (col 6 lines 43-60). See also Hatakenaka claims 1, 2 and 7-17.

2. Claims 1-9, 14 and 18-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Nomura (JPN 05-218124 A).

Nomura teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (C5-C7) and a plurality of work holders (tables) separated by gaps resting on a common lower chassis (chain) (figures 1, 2 and 12 and translation page 1, paragraph [0003]). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (rails) with indexing (positioning) means and transporting rollers (translation page 2, paragraphs [0005] - [0007]). The apparatus includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (page 2, paragraph [0007] –page 3 paragraph [0012] and page 6, paragraph [0036] – page 7, paragraph [0039]). Components and drivers are housed in the storage means (page 4, paragraph [0017] – [0023]). The control means comprises a microprocessor with control circuits (page 5, paragraph [0027]-[0028] and page 9, paragraph [0055] – [0057]). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc (page 1, paragraph [0004]). See also Nomura claims 1-5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomura (JPN 05-218124 A) in view of Brotherton et al. (USPN 6108204).

Nomura teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (C5-C7) and a plurality of work holders (tables) separated by gaps resting on a common lower chassis (chain) (figures 1, 2 and 12 and translation page 1, paragraph [0003]). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (rails) with indexing (positioning) means and transporting rollers (translation page 2, paragraphs [0005] - [0007]). The apparatus includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (page 2, paragraph [0007] – page 3 paragraph [0012] and page 6, paragraph [0036] – page 7, paragraph [0039]). Components and drivers are housed in the storage means (page 4, paragraph [0017] – [0023]). The control means comprises a microprocessor with control circuits (page 5, paragraph [0027]-[0028] and page 9,

paragraph [0055] – [0057]). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc (page 1, paragraph [0004]). However, the microprocessor is not further disclosed.

Brotherton teaches a microcomputer controller device comprising control circuits housed in a cardcage with a fan and heat sink for mounting components to circuit boards (col 3 line 48 – col 4 line 5 and col 4 lines 52-67).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ heat sinks and fans in the microprocessor housing as is conventional to protect the control circuits (Nomura, page 5, paragraph [0028] and page,12, paragraph [0071] which would typically be contained in a cardcage for control in a convenient and reliable manner.

4. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomura (JPN 05-218124 A) in view of Tsumura (USPN 4821944).

Nomura teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (C5-C7) and a plurality of work holders (tables) separated by gaps resting on a common lower chassis (chain) (figures 1, 2 and 12 and translation page 1, paragraph [0003]). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (rails) with indexing (positioning) means and transporting rollers (translation page 2, paragraphs [0005] - [0007]). The apparatus

includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (page 2, paragraph [0007] –page 3 paragraph [0012] and page 6, paragraph [0036] – page 7, paragraph [0039]). Components and drivers are housed in the storage means (page 4, paragraph [0017] – [0023]). The control means comprises a microprocessor with control circuits (page 5, paragraph [0027]-[0028] and page 9, paragraph [0055] – [0057]). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc (page 1, paragraph [0004]). However, copper wire is not disclosed.

Tsumura teaches copper as an equivalent of gold an aluminum wires (col 4 lines 56-63) for wire bonding semiconductor chips to leadframes (col 1 lines 5-12) wherein the wire may have different diameters (25-30 microns) (col 3 lines 40-60 and col 4 lines 54-64).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper wire as it is a known equivalent of gold wire in semiconductor bonding.

5. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nomura (JPN 05-218124 A) in view of Kinnaird (USPN 5839640).

Nomura teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (C5-C7) and a plurality of work holders (tables) separated by gaps resting on a common

lower chassis (chain) (figures 1, 2 and 12 and translation page 1, paragraph [0003]). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (rails) with indexing (positioning) means and transporting rollers (translation page 2, paragraphs [0005] - [0007]). The apparatus includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (page 2, paragraph [0007] –page 3 paragraph [0012] and page 6, paragraph [0036] – page 7, paragraph [0039]). Components and drivers are housed in the storage means (page 4, paragraph [0017] – [0023]). The control means comprises a microprocessor with control circuits (page 5, paragraph [0027]-[0028] and page 9, paragraph [0055] – [0057]). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc (page 1, paragraph [0004]). However, different wire diameters and patterns are not disclosed.

Kinnaird teaches a multi-tool bonder (col 3 lines 1-27 for forming different patterns on a semiconductor device (col 1 lines 10-25) using different types of wires having different diameters (col 2 lines 10-20). See also Kinnaird claims 1-10.

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper wire as it is a known equivalent of gold wire in semiconductor bonding and since the bonders are independently controlled, they are capable of forming different patterns.

6. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatakenaka et al. (USPN 4301958) in view of Carlomagno et al. (USPN 5189507).

Hatakenaka teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and leadframe comprising a plurality of bond heads (3, 5a-5c) and a plurality of work holders (tables, 54) separated by gaps for bonding different types of wires (figures 1-3 and col 2 line 45 – col 3 line 5). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. The work holders are slideable on a track (conveyors) with indexing (positioning) means (col 5 line 65 – col 6 line 41) and transporting rollers (col 3 lines 62-66). The apparatus includes lifting means for moving the leadframe from the storage means (magazine) which includes a controller and loading and unloading means (toward and away from holder and line) (col 3 lines 9-42 and col 5 lines 1-55). Components and drivers are housed in the storage means (col 7 lines 19-43). The bond heads are capable of bonding different types of wire including but not limited to gold and aluminum, etc and are capable of performing different independent operations (col 5 lines 47-55 and col 6 lines 43-60). However, the wires and operations are not further disclosed.

Carlomagno teaches gold, copper and aluminum wires as equivalents for bonding chips to lead frames. The wires can have different diameters (25-375 microns) (col 3 line 53 – col 4 line 19) and form different patterns (directions) (col 7 lines 37-58 and col 8 lines 19-46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper wire as it is a known equivalent of gold wire in semiconductor bonding and since the bonders are independently controlled, they are capable of forming different patterns (Hatakenaka, col 5 lines 47-55 and col 6 lines 43-60) in an efficient and cost-effective manner (Hatakenaka, col 1 lines 46-64).

Response to Arguments

7. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a single integrated structure with a single controller that operates multiple bond-heads of a single bonding machine) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The instant claim states "A wire bonding apparatus...comprising...a controller which is programmable to operate each bond-head of the apparatus independently...". Hatakenaka teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and lead frame comprising a plurality of bond heads (3, 5a-5c) and a plurality of work holders (tables, 54) separated by gaps for bonding different types of wires (figures 1-3 and col 2 line 45 – col 3 line 5). Although the

reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result.

Therefore the 102 rejection of claims 1, 2, 4-9 and 14 as anticipated by Hatakenaka et al. (USPN 4301958) and now includes new claims 18-20 and 22.

8. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a single integrated structure with a single controller that operates multiple bond-heads of a single bonding machine) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The instant claim states "A wire bonding apparatus...comprising...a controller which is programmable to operate each bond-head of the apparatus independently...". Nomura teaches a wire bonding apparatus for forming electrical connections between a semiconductor chip and lead frame comprising a plurality of bond heads (C5-C7) and a plurality of work holders (tables) separated by gaps resting on a common lower chassis (chain) (figures 1, 2 and 12 and translation page 1, paragraph [0003]). Although the reference does not teach the spacing for the purpose of vibration isolation as the structure is the same it is presumed to provide the same result. Brotherton teaches a heat sink attached to the motherboard in the abstract.

Therefore the 102 rejection of claims 1-9 and 14 as anticipated by Nomura stands and now includes new claims 18-22. The 103 rejection of claims 10-13 as obvious over Nomura in view of Brotherton and the 103 rejection of claims 15 and 16 as obvious over Nomura in view of Tsumura also stand.

9. In response to applicant's argument that the combination of Nomura and Kinnaird does not teach a bonding process wherein wires of different diameters are bonded, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

It is noted that claims 16 and 17 are drawn to an apparatus comprising multiple bonding heads which are capable of bonding wires of different size simultaneously.

Therefore the 103 rejection of claims 16 and 17 as obvious over Nomura in view of Kinnaird stands.

10. In response to applicant's argument that the combination of Hatakenaka and Carlomagno does not teach a bonding process wherein wires of different diameters are bonded, a recitation of the intended use of the claimed invention must result in a

structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

It is noted that claims 16 and 17 are drawn to an apparatus comprising multiple bonding heads which are capable of bonding wires of different size simultaneously.

Therefore the 103 rejection of claims 15-17 as obvious over Hatakenaka in view of Carlomagno stands.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fukusawa (USPN 4930086), Ozimec (UUSPN 3841546, different wire diameters), Jin et al. (USPN 5979739, plurality of bonding tools, track, storage, rollers, lift), Marks et al. (USPN 4551912, multiple tools), Stora et al. (USPN 5680294, controller with fans and heat sink), Mimata et al. (USPN 4890780, fans, bonding device), Campbell et al. (USPN 4985804, computer housing, fans), Richardson (USPN 4595820, controller with fans and heat sink) and Bailey (USPN 5530284, wire bonding different wire types).

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne Edmondson whose telephone number is (703) 306-5699. The examiner can normally be reached on M-F from 7-4 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (703) 308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7718 for regular communications and (703) 305-7115 for After Final communications.

Art Unit: 1725

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

Lynne Edmondson
Examiner
Art Unit 1725

LRE
March 27, 2003

[Handwritten signature]
MICHAEL J. EDMONDSON
PRIM. EXAMINER